

## 2023 Research Report: Artichokes for the Northeast

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The third year of artichoke trials was conducted at the University of Maine’s Highmoor Farm in Monmouth, ME during the 2023 growing season. The purpose of these evaluations was to obtain additional data towards development of production guidelines and artichoke cultivar recommendations for Maine farmers. Production potential for seven artichoke cultivars was compared. In a separate, concurrent experiment the effects of black mulch, reflective mulch, and bare ground culture on artichoke production were evaluated.

### Seedling Production and Vernalization

Artichokes were seeded on March 24 into 50-cell trays filled with Pro-Mix BX with Mycorrhizae media at one seed per cell. Trays were placed on 75 °F heating mats 3.5 weeks (Fig. 1). Seedlings were fertilized with 1 Tbsp/gal of Jacks Professional 9-45-15 Plant Starter soluble fertilizer on April 18 and May 12 (25 and 49 days after seeding, respectively).



**Figure 1.** Artichoke seedlings 46 days after seeding (May 9).

To vernalize plants, trays were moved to a 42 °F walk-in cooler for approximately 23 days (550 hours) beginning on May 17. A full-spectrum LED lighting system was placed above the trays and plants were watered as needed (Fig. 2). On June 9, trays were moved outdoors to harden off. This was about a week later than planned because heavy spring rains prevented beds from being formed and mulched. Three days later, seedlings were transplanted by hand using a jab planter (June 12, 80 days after seeding).



**Figure 2.** Artichoke seedlings vernalizing in cold storage under full spectrum lighting.

### Field Preparation

Beds were amended with 500 lb/ac of 10-10-10 fertilizer and tilled to incorporate on May 31, 12 days before transplanting. On June 9, three days before transplanting, raised beds were shaped and covered with 1.1 mil embossed black plastic with drip tape buried right of center under each bed. In the mulch trial, black plastic was removed from bare ground and reflective mulch plots, and re-covered with reflective mulch where appropriate.

### Weather

The second wettest growing season on record in central Maine was recorded in 2023 with over 28" of rain. Nighttime temperatures were also unusually warm from May to September – the average low temperature was 52.5 °F, the warmest on record for this area. These conditions were challenging for many crops but did not appear to inhibit artichoke vigor or production. Later in the season, however,

conditions were very conducive to gray mold (*Botrytis cinerea*), which led to much greater crops loss than in previous years.

### Mulch Trial

We compared production of Green Globe Improved artichoke grown on bare ground, black plastic much, and reflective mulch (Fig. 3). We hypothesized that 1) black plastic would reduce plant vigor by heating the soil and 2) potentially devernalize plants, reducing yield, and that 3) reflective mulch would reduce aphid populations, improving plant health and yield.



**Figure 3.** Mulch trial planted at University of Maine’s Highmoor Farm in Monmouth, ME on July 5 (23 days after transplanting). *Front to back:* black plastic, bare ground, and reflective mulch treatments.

Mulch treatments were arranged in a randomized complete block design and replicated four times. Each plot contained seven Green Globe Improved artichoke plants spaced 2 feet apart within rows, and data were collected from the central five plants individually. After transplanting, plants were immediately watered in with 1 cup of 9-45-15 water-soluble fertilizer solution. Due to the extremely wet season, plants were not irrigated or fertilized for the remainder of the season. Weeds were controlled with hand cultivation and flaming. Captan and Asana® XL (esfenvalerate) were applied at

label rates once during the season (July 11, 29 days after transplanting) to control gray mold and insect pests, respectively. Additional pesticide applications may have benefitted artichoke production, but it was too wet to spray.

Harvest began 63 days after transplanting on August 14, earlier and after fewer days post-transplanting than in previous years. Buds were harvested weekly until October 2 (112 days after transplanting), when cull rates became excessive due to gray mold, stink bug (Fig. 4), and aphid pressure. Marketable buds were collected from the central five data plants by clipping with hand shears so that 2-3" of stem remained, and were sorted into USDA size classes of 48s (3-3.5"), 36s (3.5-4"), 24s (4-4.5") and 18s (>4.5"). Buds smaller than 3" in diameter were deemed marketable despite the lack of a USDA size class because we believe there is market potential for this size in Maine, and were categorized as "very small". This size class could be sold from bulk containers by weight or pre-grouped into pint or quart cartons, with the intent of marketing them for use similar to the "hearts" of larger sized buds. Here, USDA size classes were grouped into a "large" category spanning 3 – 4.5" in diameter, indicating that any bud at this size had potential for selling individually as per standard practice. Bud numbers and weights were recorded for individual plants.



**Figure 4.** *Left:* Stink bug on Violetto artichoke. *Right:* Stink bug feeding at the base of developing buds results in claw shaped artichokes.

#### Mulch Evaluation

Nearly all plants produced artichokes regardless of mulch treatment (Table 1), in stark contrast to the poor flowering rate in 2022 mulch evaluations. Improved vernalization conditions probably accounted for this difference. Plants in 2023 received 550 hours of chilling and had supplemental lighting, compared to 303 hours without light in 2022.

**Table 1.** Effect of mulch on Green Globe Improved artichoke production at University of Maine’s Highmoor Farm in Monmouth, ME in 2023.

Mulch	Flowering Plants	Marketable Buds per Flowering Plant						% Unmarketable	
		Very Small (< 3")		Large (3 to > 4.5")		Total Marketable			
	%	#	g	#	g	#	g	#	g
Bare ground	95	9.2	370	0.5	71	9.7	441	29.7	19.1
Black plastic	100	12.2	559	0.8	131	13.0	690	24.8	13.7
Reflective	95	16.6	679	0.4	60	17.0	738	31.7	22.3

\* Values in a column with no shared letters indicate a difference between mulches at  $p < 0.05$ .

Plants also yielded well across all mulch treatments (Table 1). The number of very small buds generally accounts for most of the increased yield across mulches and varieties. When only large buds are considered, black mulch tended to have higher yields and a higher number of flowering plants, but this effect was not significant overall. The lower yields observed in the bare ground plots may have been due to greater nutrient leaching compared to plastic mulched plots. Interestingly, the aphid pressure did not appear to be reduced by the reflective mulch (Fig. 5).



**Figure 5.** Green peach aphids on underside of artichoke leaf in reflective mulch plot on July 5 (23 days after transplanting).

### Cultivar Evaluation

Seven artichoke cultivars were evaluated in a randomized complete block design with four replications (Table 2). All cultivars were grown on black plastic mulch. This cultivar trial utilized the same cultural practices as the mulch trial, except plots were 24’ long (12 plants) with data collected from the central ten plants. Data were collected in the same manner as in the mulch trial.

**Table 2.** Characteristics of seven artichoke cultivars evaluated at University of Maine’s Highmoor Farm in Monmouth, ME in 2023.

Cultivar	Color	Bred for Annual Production?	Organic Seed Available?	Hybrid Status	Spiny?
Green Globe Improved	green			OP	yes
Imperial Star	green	✓	✓	OP	yes
Imperial Star Purple	purple	✓	✓	OP	no
Romanesco	pink			OP	few
Tavor	green		✓	OP	few
Violetto	purple			OP	very
Wonder	green	✓	✓	F1	no

Harvest followed the same schedule as the mulch trial. Only 68% of Violetto plants flowered, which was significantly lower than other cultivars (Table 3). Violetto may have a chilling requirement greater than 550 hours, or be particularly prone to devernalization. Tavor and Wonder had the greatest yield of marketable buds. Imperial Star and Tavor produced a significantly greater number of large sized buds compared to Romanesco with close to one per flowering plant. Green Globe Improved, Romanesco, Tavor, and Wonder all produced more marketable buds than Violetto, reflecting the same pattern for the number of very small buds. Very small buds account for the majority of artichokes produced, and factor heavily into total yield differences. Unmarketable buds were primarily due to gray mold and stink bug damage. Production potential, or total yield, was 13 to 45% greater than actual marketable yields because we could not manage these in the wet season.

**Table 3.** Marketable yield of eight artichoke cultivars grown at University of Maine’s Highmoor Farm in Monmouth, ME in 2023.

Cultivar	Flowering Plants	Marketable Buds per Flowering Plant						% Unmarketable	
		Very Small (< 3")		Large (3 to > 4.5")		Total Marketable		#	g
	%	#	g	#	g	#	g		
Tavor	100 a*	13.0 a	548 a	0.9 a	153 a	13.9 a	702 a	22.2 c	15 bc
Green Globe Improved	100 a	12.5 a	526 ab	0.4 ab	69 ab	12.9 a	595 ab	22.1 c	15 bc
Wonder	97 a	12.0 a	555 a	0.7 ab	129 ab	12.7 a	683 a	23.1 bc	14 bc
Romanesco	88 a	12.2 a	510 ab	0.3 b	42 b	12.5 a	552 ab	15.2 c	11 c
Imperial Star	100 a	9.5 ab	430 ab	0.8 a	136 ab	10.3 ab	566 ab	44.7 a	30 a
Imperial Star Purple	92 a	9.0 ab	372 ab	0.4 ab	68 ab	9.5 ab	440 b	37.8 ab	26 ab
Violetto	68 b	6.1 b	346 b	0.6 ab	91 ab	6.7 b	437 b	13.0 c	11 c

\* Values in a column with no shared letters indicate a difference between cultivars at  $p < 0.05$ .

## Green Globe Improved



- Older, standard cultivar
- Generally high-yielding
- Underwhelming consistency and appearance
- Bracts tend to be pointed and often splay prematurely
- Spiny

## Imperial Star



- First cultivar bred for annual production
- Generally a top-yielding variety, although may be especially susceptible to gray mold
- Nicer buds have commercial quality, but inconsistent
- More attractive than Green Globe Improved with less pointed bracts and tighter, slightly more elongated buds
- Very spiny

## Imperial Star Purple



- Bred for annual production with Imperial Star parent
- Lower yielding than Imperial Star
- Purple at base of bracts is very subtle and can be totally absent in warmer temperatures
- Otherwise very similar in appearance to Imperial Star
- Spineless

## Romanesco



- Heirloom variety with occasional rosy blush color at bract tips
- Markedly less vigorous than other cultivars
- Lower yield of large buds
- Variable bud and bract shapes
- Highest quality are the very small buds
- Few spines



## Tavor



- High-quality and high-yielding
- More uniform appearance than Green Globe Improved and Imperial Star
- Buds are generally dense, compact, and round
- Rounded bracts sit around receptacle (heart) rather than on top of it, giving it a nice shape
- Commercial quality
- Few spines
- Organic seed available

## Violetto



- Extremely variable cultivar
- Gorgeous purple color in cool end-season temperatures
- Elongated buds and bracts with shapes that vary from oval to vase-like to fountain-shaped
- Strong tendency to splay at larger sizes
- Smaller buds can be nicely compact
- Low flowering rates and yields
- Spines can be 2-3 mm long

## Wonder



- Hybrid spineless variety bred for annual production
- Variable yields
- Relatively compact buds, but shape is more variable than expected for hybrid
- Some commercial quality buds
- Spineless
- Organic seed available

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